## AMENDMENTS TO THE CLAIMS

Please amend the claims as follows:

1. (Amended) A system ~~for detecting and enhancing meteorological imagery of dust clouds~~ comprising:

a storage portion operable to store ~~collector for storing~~ multispectral optical-spectrum imagery data ~~having~~ from multiple channels relating to different wavelengths across the visible, shortwave infrared, and thermal infrared portions of the optical ~~spectrum,~~ spectrum;

a processor ~~operatively coupled to said collector, wherein the processor~~ operable to process ~~receives~~ the multispectral optical-spectrum imagery data ~~and processes the digital data by:~~ by performing a numerical atmospheric correction on a portion of the multispectral optical-spectrum imagery data for removal of molecular scatter within all of the visible-spectrum channels, based on radiative transfer calculations stored in pre-computed look-up tables and indexed as a function of solar and sensor geometry, by determining ~~the~~ pixel background for each pixel of ~~the~~ an image corresponding to the multispectral optical-spectrum imagery data by combining known earth location data with data from a terrestrial database, and ~~employing a background-dependent algorithm to compute~~ by computing, via a background-dependent algorithm, the dust enhancement variable ~~Δ,~~ Δ; and

a display comprising ~~means for displaying the multispectrial imagery coupled to the processor, wherein the means for displaying the multispectrial imagery comprises~~ a red, blue and green color display portions operable to display ~~for displaying~~ the processed multispectral optical-spectrum imagery in the visible light spectrum via a hue/saturation decomposed color technique.

2. (Amended) The system of claim 1, wherein said processor is further operable to calculate, ~~whereby~~ when a pixel is determined to have a water background, ~~the processor calculates the~~ a log-scaled normalized difference ($D$) between ~~the~~ two channel reflectivities according to ~~the~~ a relation:

$$\Delta = \frac{\alpha_{865} - \alpha_{412}}{\alpha_{865} + \alpha_{412}}$$

$$D = \log_{10}\left(\frac{R_2 - R_3}{R_2 + R_3}\right),$$

and to byte-scale ~~byte-scaling this quantity~~ $D$ over a ~~the~~ range [-0.40, 0.15],

wherein a ~~where the~~ bidirectional reflection function ($R_k \in [0, 1]$) at channel (k) is expressed in terms of channel radiance ($I_k$) as:

$$R_k = \frac{\pi I_k}{\mu_o F_{o,k}}$$

and $\mu_o$ and $F_{o,k}$ are the cosine of the solar zenith angle and band-weighted solar spectral flux, respectively.

3. (Amended) The system of claim 2, wherein said storage portion is operable to store the multispectral optical-spectrum imagery from a first channel having ~~has~~ a central wavelength in the shortwave infrared at approximately 0.83-0.88 $\mu$m, a second channel having ~~has~~ a central wavelength in the indigo/blue part of the spectrum at approximately 0.41-0.46 $\mu$m, and a third channel having ~~has~~ a central wavelength in the green part of the spectrum at approximately 0.50-0.55 $\mu$m.

4. (Amended) A system ~~for detecting atmospheric dust~~ comprising:

a storage portion operable to store ~~collector for storing~~ multispectral optical-spectrum imagery data ~~having~~ from multiple channels relating to different wavelengths,

a processor ~~operatively coupled to the collection means, wherein the processor~~ operable to process ~~receives~~ the multispectral optical-spectrum imagery data, ~~and processes the digital data~~ by: performing a numerical atmospheric correction on a portion of the multispectral optical-spectrum imagery data for removal of molecular scatter within all of the visible-spectrum channels, based on radiative transfer calculations stored in pre-computed look-up tables and indexed as a function of solar and sensor geometry, by determining ~~the~~ pixel background for each pixel of ~~the~~ an image by

combining known earth location data with data from a terrestrial database, and by computing, via ~~employing~~ a background-dependent algorithm, ~~to compute~~ the dust enhancement variable $D$,

wherein said processor is further operable, when a pixel is determined to have a water ~~background,~~ background such that $D=D_{wat}$, ~~and the processor calculates~~ to calculate a ~~the~~ log-scaled normalized difference ($D_{wat}$) between a second channel reflectivity and a third channel reflectivity ~~reflectivites~~ according to the relation:

$$D_{wat} = \log_{10}\left(\frac{R_2 - R_3}{R_2 + R_3}\right),$$

and to byte-scale ~~byte-scaling~~ this quantity over the range [-0.40, 0.15], where a ~~the~~ bidirectional reflection function ($R_k \in [0, 1]$) at channel (k) is expressed in terms of channel radiance ($I_k$) as:

$$R_k = \frac{\pi I_k}{\mu_o F_{o,k}}$$

and $\mu_o$ and $F_{o,k}$ are the cosine of the solar zenith angle and band-weighted solar spectral flux, respectively.

5. (New) A device for use with an image comprising pixels derived from multispectral optical-spectrum imagery data from multiple channels relating to different wavelengths across the visible, shortwave infrared, and thermal infrared portions of the optical spectrum and with a display, said device comprising:

a removing portion operable to remove, from a first portion of the pixels, effects of atomospheric molecular scattering;

a scaling portion operable to scale spectral radiance of a second portion of the pixels;

a flagging portion operable to flag a third portion of the pixels as cloudy;

a dust enhancement portion operable to define a dust enhancement parameter;

a scaling portion operable to scale the dust enhancement parameter;

a differentiating portion operable to differentiate, within the third portion of the pixels, a set of cloud pixels from a set of dust pixels based on the scaled dust enhancement parameter; and

a changing portion operable to change color of the set of dust pixels.

6. (New) A method of modifying an image comprising pixels derived from multispectral optical-spectrum imagery data from multiple channels relating to different wavelengths across the visible, shortwave infrared, and thermal infrared portions of the optical spectrum and with a display, said method comprising:

removing, from a first portion of the pixels, effects of atomospheric molecular scattering;

scaling spectral radiance of a second portion of the pixels;

flagging a third portion of the pixels as cloudy;

defining a dust enhancement parameter;

scaling the dust enhancement parameter;

differentiating, within the third portion of the pixels, a set of cloud pixels from a set of dust pixels based on the scaled dust enhancement parameter; and

changing color of the set of dust pixels.